THE BOTANICAL GARDEN OF OAXACA

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I. General

At the end of the year 1909, when I was at the head of the Teachers' Normal School of the State of Oaxaca, a post which I had held since the middle of 1891, I was asked by the Ministry of Improvements, Colonization and Industry, at that time under Sr. Lic Don Olegario Molina, to assume the management of the Botanical Garden which was to be established on the grounds of the Agricultural Experiment Station of the same state. This station is situated about four kilometers from the city and had been in operation for only a few months.

Professor Don Félix Foëx, the first director of the station, was entrusted with the establishment of the Garden. He had several interviews with me; however attractive the proposition appeared to me, I could not decide to accept it. Finally, after much hesitation, I accepted the new position, and since then I have devoted myself to it entirely, even though success is doubtful; without fear of being contradicted, I can say boldly that I have been everything in the Botanical Garden, laborer, manager, topographer, landscape gardener, clerk, gardener, excursionist, and a hundred other things besides.

At the beginning of 1910 there was a general suspension for several months of the activities of the Station. As soon as the work could be resumed I devoted, with the half dozen men that I had at my command, the rest of that year and the whole of 1911 to the preliminary task of levelling, cleaning and adapting, in general, the ground for the new branch of the Station. This was a mistake; I recognize it now when it is too late. I should have insisted that the Botanical Garden, which was to be established on the grounds of the Station, be absolutely independent of the latter, or else I should have refused its management. Unfortunately, I did neither, and to this date

I deplore the consequences of such a serious lack of forethought, since, depending on the wills of others with ideas differing from mine, the Garden will never be able to prosper, or will prosper with great difficulties on account of lack of freedom.

Having finished the preliminary tasks which I had undertaken, I proceeded to make a sketch of the Garden as shown in fig. 1, which is here reproduced as approved by the authorities. As may be seen in the sketch, the Botanical Garden of Oaxaca is still in the process of formation. The tract of land assigned to it consists approximately of nine hectares, an area extensive enough to contain all the most prominent specimens of the mundane flora and all the characteristic specimens of the national flora.

Of the three valleys of the Station to the east of the Oaxaca and Ejutla Railroad, the Garden occupies the middle one, which is the one best suited for that purpose and at the same time most accessible. At the beginning it was subdivided into five departments, somewhat unequal in size, together comprising a rectangle 400 meters in length (from north to south) by 200 meters in width (from east to west); but later this area was increased by an addition of 3,000 square meters, which was annexed to the southwest corner, and again by a sixth department, semilunar in outline, comprising 5,000 square meters, annexed at the middle part of the west side. Deducting from this total area about two hectares which will be taken up by the prospective lake, walks, and lanes, there remain not more than seven hectares of land which can be utilized for the cultivation of plants.

As I have shown in a recent work, the Botanical Garden of Oaxaca is the first and only one worthy of the name in the whole of the Republic. This fact alone, signifying a positive progress, should have been sufficient to enlist the support of the authorities, as well as the public in general; but contrary to what might be expected, its existence has been, especially recently, extremely neglected. I have made this clear in the opinion expressed in my reports to the higher authorities, as may be seen from the following:

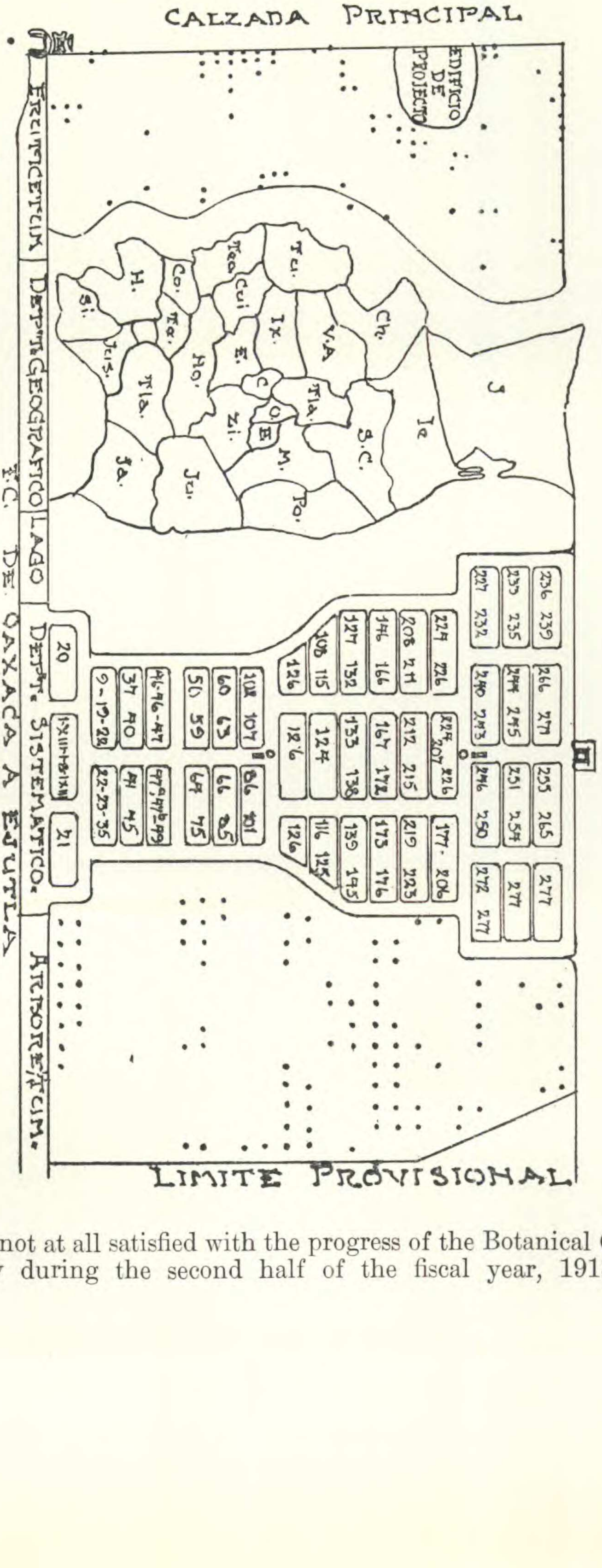

Fig. 1. Sketch of the Botanical Garden of Oaxaca in process of formation.

'I am not at all satisfied with the progress of the Botanical Garden, especially during the second half of the fiscal year, 1913–1914.

Receiving no encouragement, lacking entirely means and workmen, its existence has been extremely difficult, so much so that it would be practically impossible for it to continue under the same conditions for any length of time without failing for want of support. I must not cherish any illusions in this respect, and I consider it my duty to make this clear with all frankness.'

In the same report I point out:

'Such a difficult situation is due especially to the deplorable conditions which have depleted the Public Treasury, and that as soon as the present sad state of affairs disappears (which, fortunately, seems to be already taking place), all the branches of the administration will again receive that encouragement of which they are in such great need.'

And this I believe sincerely, since I have faith in the movement which is being started for the salvation of the country and for the restoration of peace.

After all, this is the history of the development of every new idea; it is obliged to struggle on its own merits—with danger of being suppressed—against all kinds of difficulties. One of these, and certainly not the least which I have encountered, has been the predominating instability everywhere, due to the political disturbances which have been ravaging the country for a long time. This circumstance and the absolute lack of means have prevented me from making the trips which I had planned in order to bring to the Garden some living plants, which to-day constitute the most pressing need of our institution. I am convinced that the life of the Botanical Garden depends essentially on providing it with plants. Since the departments are really well prepared, the essential thing now is to fill them with plants, preferably with the greatest possible number of specimens of the Mexican flora which are found in the mountains; and the only effective way of obtaining them is to go and get them. As long as this cannot be done, the work of the Garden must be limited to the routine work of preserving what is already there.

II. Detailed Description

At the end of 1913, according to the compilation made at that time, the Botanical Garden contained the following

plants: 1,099 in the systematic department, 101 in the arboretum, 1,158 in the propagation department, and 1,035 in the geographical department and the fruticetum, or a total of 3,393 specimens. For reasons already mentioned, the Botanical Garden from then until now has not only remained stationary, since it has received no appreciable additions, but it has also deteriorated a great deal, partly because a great number of plants have dried up from lack of water, and partly because its personnel—reduced to only four workmen—is insufficient to attend to the varied duties which are required. In fig. 1 some of the plants are indicated by black dots as occurring in the outer departments, arboretum and fruticetum, neither of which have any particular shape.

GEOGRAPHICAL DEPARTMENT

This department, on the contrary, is meant to represent in its main outlines the political map of the State of Oaxaca, the divisions of which are marked with the initial letters of the districts which constitute it. These districts at present are grouped, primarily on the basis of their climatic conditions, into six natural regions, as follows: Central, Cuicateca, Serrana, Istmica, Costena, and Mixteca, separated from one another by lanes two meters in width. The edges of these regions have already begun to receive—as a kind of an enclosure—the typical plants of each region, while the interior of each will receive the most characteristic vegetable productions of the exuberant soil (see fig. 2).

In accordance with this plan, the central region (fig. 2), which consists of the districts (see fig. 1) E—to the right of O—(Etla), Zi (Zimatlan), M (Miahuatlan), E—to the left of C—(Ejutla), Tla (Tlacolula), and O (Ocotlan), all bordering on, or similar by their products to, district C (Center), shows now on its perimeter 121 specimens of *Ceanothus azureus*, a vigorous and elegant shrub of the hills which surround the Capitol.

The point corresponding to Santa Maria del Tule, a small village in the same region and situated about two leagues east of Oaxaca, is planted with a shrub "Sabino del Tule"

(*Taxodium distichum*) two meters in height and a direct offspring—by seed—from its historic parent. Among other things, it has the merit of being the oldest member of the department.

The Cuicateca region, consisting of the districts Cui (Cuicatlan), Teo (Teotitlan), and Tu (Tuxtepec), is limited now to 65 specimens of *Vallesia glabra*, or "Tree of the Pearls," native of the Canyon of Tomellin. This small collection is characterized by its exuberant growth and uniform size. Of the districts which constitute this region, only Cuicatlan has received a supply of plants—twenty-two different specimens from Quiotepec. Among these are six plants of *Bursera sucedanea* from Linaloé, called "Palo Hediondo" (fetid stick) by the natives of that place.

Three districts form the Serrana region, Ix (Ixtlan), V. A. (Villa Alta), and Ch (Choapam); only very recently I have planted around these, 81 specimens of *Cerocarpus fothergylloides*, a beautiful rustic little tree which is native of this region.

The perimeter of the Istmica region, composed of the districts J (Juchitan) and Te (Tehuantepec), was also planted in a similar manner with some 34 specimens of an arboreal *Pereskia*, new to science, from the coast of Salina Cruz. In the district of Tehuantepec I have planted 30 plants coming from the same region and belonging to about a dozen species in several genera—*Stemmadenia, Pedilanthus, Mimosa*, etc., and in the district of Juchitan species of several genera of the *Cactaceae—Opuntia, Cereus, Mamillaria, Selenicereus, Echinocactus*, etc.—have been planted.

On the southern side of this department there are planted 40 palm-trees, species of *Phoenix*, about two meters high, bordering a walk which bears the name of the famous Brazilian botanist, Barbosa Rodrigues; while on the north side runs another walk, five feet wide, called "Andres Cesalpino," along the edges of which we have planted 148 specimens of *Poinciana Conzattii* Rose, brought from Tehuantepec.

Finally I shall mention the collection of Mexican agaves

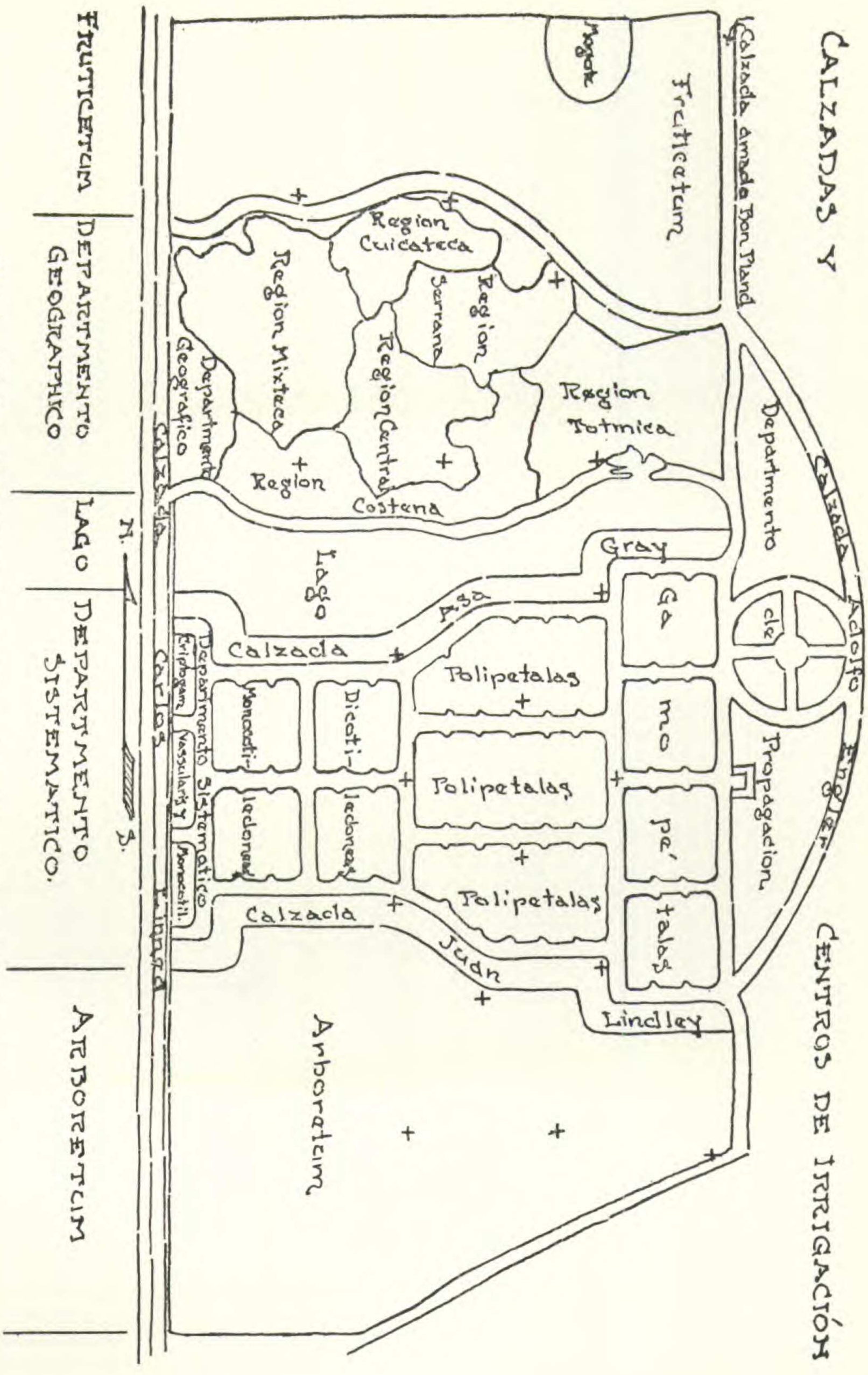

Fig. 2. Walks and irrigation centers in the Botanical Garden of Oaxaca.

which are in the district H (Huajuapam) of the Mixteca region, as well as the fact that it is planned to introduce into

this department various groups of practically useful plants —industrial, tinctorial, poisonous, medicinal, etc.

DEPARTMENT OF PROPAGATION

This department is situated in the middle eastern part of the Botanical Garden and comprises an area of not more than half a hectare. Its shape is that of a semicircle bounded on its convex side by the Adolf Engler walk; this is the name of the famous author of the classification adopted by the Garden, with few very slight exceptions suggested by the 'Lexicon Generum Phanerogamarum' of von Post and O. Kuntze. The sides of this walk are planted for the time being with various specimens of *Melia Azedarach,* but in the near future these will be replaced by specimens of "Rosa-Cacao," an imposing pyramid-like tree with horizontal and vertical branches.

As indicated by the name, this department is devoted to the propagation of plants for this Garden and similar establishments in this and other countries.

WALKS AND IRRIGATION CENTERS

Of the walks of the Garden, the one called "Carlos Linneo" forms the western boundary line of the Garden and serves it, so to speak, as a base. It is a straight line 420 meters long, running from north to south, parallel to the Oaxaca and Ejutla Railroad, and throughout its length there are, five feet apart, 84 specimens of *Casuarina stricta* about three meters in height. Two other walks worth mentioning on account of their width (10 meters) are the Asa Gray and the John Lindley walks; these run along the outer side of the systematic department and have as a border 105 laurels from India, as yet rather small.

One of the far-reaching improvements for the progress of the Botanical Garden has been the establishment of a practical irrigation system, which was first introduced at the end of 1913 and developed later as shown in fig. 2.

For this purpose we first laid under the ground 400 meters of $2\frac{1}{2}$-inch pipe through the center of the Garden from the large circular tank, situated on the southern slope, to the wide

avenue leading from the Station building on the north. This was the main artery and at fixed points, which were carefully selected beforehand, crosses were placed to mark the respective connections. These consisted of lateral ramifications of smaller pipe which were to carry the water to the 35 irrigation centers, 50 meters apart, into which the Garden is subdivided.

All these centers must have nozzles, and at present there are 18 of them in working order; these are marked with crosses in fig. 2. To install them we have used 500 meters of smaller piping, so that a similar amount, if not a little more, would be required to complete the network. Of these irrigation centers eight belong to the arboretum, twelve to the systematic department, seven to the geographical department, five to the fruticetum, and three to the propagation department. As soon as the Botanical Garden has completed its irrigation system and has a sufficient supply of water for all seasons, we shall be able to consider its existence as assured.

SYSTEMATIC DEPARTMENT

Together with the two preceding departments, the geographical and propagation departments, the systematic department constitutes the central part of the Garden, and from the botanical point of view is the most interesting of them all. Many plants have already been planted in it, as may be seen in pl. 3, which represents the central part of the department; but the empty places are still numerous, and the need of having them planted is great. The shape of this department is that of an immense cup, 200 meters long and measuring 145 meters at its widest part.

As I have shown in a previous paper, which was published some time ago in the 'Memorias y Revista de la Sociedad Cientifica "Antonio Alzate,"' of Mexico, and to which I now refer for a better presentation of this subject, 'its interior is subdivided into 45 large squares approximately equal, among which are distributed the 277 phanerogamic families of the "Syllabus" of Dr. Engler.' The plants in this department, therefore, are arranged strictly in the order of affinity,

namely, vascular cryptogams and monocotyledons at the base, followed in order by the dicotyledonous groups, *Apetalae, Polypetalae,* and finally the *Gamopetalae.* With the latter the lineal series is closed, since according to the consensus of modern opinion they constitute the most highly differentiated group of flowering plants.

In the preceding lines I have endeavored to condense the most prominent features relative to the life of the Botanical Garden of Oaxaca. They are totally without pretense on my part, although they would wish to carry to the minds of all those who may read them the same high concept which I myself have formed of such a progressive institution.

In spite of the discouragement that I often feel about the Garden, I have confidence in its final success. Everything indicates that to-day the Republic is approaching rapidly a better era, which will be effected through organic peace and progress in its truest sense, since the horizon appears already free from the dark clouds.

In concluding, I wish to say that the Botanical Garden of Oaxaca, after showing itself in the preceding lines in all its smallness, has the honor of sending its older brother, the Missouri Botanical Garden of St. Louis, its most cordial congratulations for the Twenty-fifth Anniversary, wishing it long life and abundant prosperity.

Explanation of Plate

PLATE 3

General view of the Botanical Garden of Oaxaca, Mexico, particularly of its Systematic Department.